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 INFORMATION FROM
 FOREIGN DOCUMENTS OR RADIO BROADCASTS

REPORT

CD NO.

COUNTRY USSR
 SUBJECT Economic - Coal mining, cycle work schedule
 HOW PUBLISHED Monthly periodicals
 WHERE PUBLISHED Moscow
 DATE PUBLISHED Oct, Dec 1953
 LANGUAGE Russian

DATE OF INFORMATION 1951-1953

DATE DIST. 29 Apr 1954

NO. OF PAGES 8

SUPPLEMENT TO REPORT NO.

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CYCLE WORK SCHEDULE IN USSR COAL MINES

SUGGESTIONS FOR IMPROVING CYCLE WORK SCHEDULE IN MOSCOW BASIN -- Moscow, Ugol', No 12, Dec 53

The cycle work schedule began to spread in the Moscow basin in August 1951. Articles on this subject seek to point out the advantages of this work system based on the experiences of outstanding sections of the Moscow basin, but do not analyze failures or consider the experience of faces working seams more than 2.5 meters thick.

Most of the mines working thick seams in the Moskvougol' Combine are in the Krasnoarmeyskugol' and the Stalinogorskugol' trusts. The daily output of mines of these two trusts is 50 percent of the output of the whole combine, and 12 mines which work thick seams are responsible for 30 percent of the output of all mines of the trusts. Thus the problem of organizing the cycle work schedule at faces in seams more than 2.5 meters thick is extremely important. As of the second quarter 1953, the distribution of faces in the Krasnoarmeyskugol' and Stalinogorskugol' trusts, according to the removable thickness of the seam, is as follows:

| | <u>Krasnoarmeyskugol' Trust</u> | | | <u>Stalinogorskugol' Trust</u> | | |
|-------------------------------------|---------------------------------|-----------------------------|-----------------------------|--------------------------------|-----------------------------|-----------------------------|
| <u>Removable Thickness of Seam:</u> | <u>Total No of Faces</u> | <u>No on Cycle Schedule</u> | <u>Percent of All Faces</u> | <u>Total No of Faces</u> | <u>No on Cycle Schedule</u> | <u>Percent of All Faces</u> |
| Up to 2.5 meters | 46 | 16.7 | 35.3 | 42.1 | 14.7 | 34.9 |
| 2.51-3 meters | 18.4 | 5 | 27.1 | 11.7 | 2.0 | 17.1 |
| Over 3 meters | 14.6 | 2 | 13.7 | 7.0 | 1.3 | 18.5 |
| Total | 79 | 23.7 | 29.9 | 60.8 | 18.0 | 29.6 |

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This table indicates that more than 40 percent of all working faces in the Krasnoarmeyskugol' Trust and more than 30 percent of those in the Stalinogorskugol' Trust are working seams more than 2.5 meters thick. At the same time, only 21 percent of these faces have converted to the cycle work schedule in the Krasnoarmeyskugol' Trust and only 17.5 percent in the Stalinogorskugol' Trust. Of the number of faces converted to the cycle work schedule, faces in seams less than 2.5 meters thick make up more than 70 percent of those in the Krasnoarmeyskugol' Trust and more than 80 percent of those in the Stalinogorskugol' Trust.

There are faces in seams more than 3 meters thick in mines of both trusts but the cycle work schedule has been introduced in only one to two of such faces. Thus, faces in seams more than 2.5 meters thick are usually not converted to the cycle work schedule in the Moscow basin. The principal reasons are as follows: present delivery devices are inadequate for handling the large output from one cycle; and it is difficult to organize labor since unstable roofs make it impossible to remove coal simultaneously along the entire line of the face.

Two years' experience by Moskvougol' Combine faces on the cycle work schedule indicates the following relationship between cycling faces and volume of output from one section.

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| Output of Sections Converted to Cycle Work Schedule, Tons a Day | Face-Months Worked by Cycling Sections, 1 Aug 51-1 Aug 53 | | <u>CONFIDENTIAL</u> Completion of Cycle Norm | | | Completion of Cycle/Day | | |
|--|---|---------------------------------|---|---|---|-------------------------|---|--|
| | Face-Months | Percent of Total Face-Months | Face-Months | Percent of Total Face- Months With Indicated Output | Percent of Total Face- Months Com- pleting Cycle Norm | Face-Months | Percent of Total Face- Months With Indicated Output | Percent of Total Face- Months Com- pleting Cycle/Day |
| | | | | | | | | |
| | | | | | | | | |
| Up to 200 | 71 | 6.3 | 12 | 17.1 | 1.7 | 5 | 7.3 | 2.9 |
| 201-300 | 278 | 24.3 | 118 | 42.5 | 17.1 | 41 | 14.8 | 23.8 |
| 301-400 | 378 | 32.8 | 252 | 66.6 | 37.4 | 63 | 16.6 | 36.7 |
| 401-500 | 337 | 29.3 | 240 | 71.2 | 35.5 | 54 | 16.0 | 31.2 |
| 501-600 | 66 | 5.9 | 50 | 73.5 | 7.4 | 6 | 8.8 | 3.6 |
| Over 600 | 16 | 1.4 | 6 | 37.4 | 0.9 | 3 | 18.7 | 1.8 |
| Total | 1148 | 100.0 | 678 | 59.0 | 100.0 | 172 | 15.0 | 100.0 |

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The data in the above table show that, of all the face-months worked in 2 years by all sections converted to the cycle work schedule, 86.4 percent were worked by sections which had an average daily output of 201-500 tons, 6.3 percent, by sections with an output of less than 200 tons per day, and 7.3 percent, by sections with an output of more than 500 tons per day. The cycling sections with an output of less than 200 tons per day were usually faced with unexpected hydrogeologic conditions, such as water seepage and tapering out of the seam.

Of all the face-months in which a cycle per day was completed, 92 percent fell into the group with an output of 201-500 tons per day. This group also accounted for 90 percent of the face-months in which the cycle norm was fulfilled.

One cycle per day was completed for 9 face-months by sections with an output of more than 500 tons per day and then only where the faces had two transport passages and two loading points. Sections with an output of more than 600 tons per day completed one cycle per day for 3 face-months and then only where the faces had two transport passages.

The output from one cycle depends on the removable thickness of the seam, the length of the face, and the depth of the cut. The prevailing depth of the cut in the Krasnoarmeyskugol' Trust is 1.5 meters and in the Stalinogorskugol' Trust, 1.8 meters.

Double faces in the Moscow basin are 106 meters long with a pillar between the faces, and single faces are 56 meters long. Under existing conditions, it is expedient to convert to the cycle work schedule the double faces with a removable thickness of not more than 2.5 meters and depth of cut of 1.5 meters, and the double faces with a removable thickness of somewhat more than 2 meters and depth of cut of 1.8 meters. Single faces from 65 to 80 meters long may be converted to the cycle work schedule regardless of the thickness of the seam.

The 2-year experience has shown that single faces with a large amount of removable thickness operate more successfully than double faces. All faces in a seam more than 3 meters thick which completed one cycle per day, and 62.5 percent which fulfilled the cycle norm, were single faces.

Half of the faces in seams from 2.51 to 3 meters thick which completed one cycle per day were single faces. However, when there is a great volume of output from one cycle, one cycle per day may be completed even with the existing productivity of conveyance devices, if there is one transport passage for each face or two transport passages for three faces.

The following table gives indexes for all the Moskvougol' Combine faces and for those converted to the cycle work schedule for 1952 and for the second quarter 1953:

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| | 1952 | | | Second Quarter 1953 | | |
|---|------------------|--|--|---------------------|--|--|
| | <u>All Faces</u> | <u>Those Con- verted to Cycle Work</u> | <u>Those Com- pleting Cycle Norm</u> | <u>All Faces</u> | <u>Those Con- verted to Cycle Work</u> | <u>Those Com- pleting Cycle Norm</u> |
| Average number of working faces | 316.3 | 62.4 | 41 | 318.7 | 108 | 66.3 |
| Average daily output of face (percent) | 100.0 | 140.0 | 149.3 | 102.7 | 125.1 | 136.0 |
| Average monthly advance (meters) | 31.0 | 44.0 | 46.5 | 30.8 | 41.6 | 46.7 |
| Productivity of worker per section per shift (tons) | 3.96 | 4.69 | 4.95 | 4.07 | 4.37 | 4.76 |

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On the basis of data accumulated in working faces in seams more than 2.5 meters thick, the following conclusions may be drawn:

1. It is possible to employ the cycle work method effectively.
2. Sections with an output of 501 to 600 tons or more per cycle can complete one cycle per day or the cycle norm only with a transport passage for each face or two passages for three faces (e.g., faces No 67-69-71 of Mine No 4 of the Molotovugol' Trust).
3. The majority of faces operating on the cycle work schedule have the following length: single faces, 50-60 meters; double faces, 110-130 meters. Consequently, a great percentage of output from one cycle depends mainly on the thickness of the seam and only in individual cases (such as triple faces) on the increased line of the front.
4. Faces converted to the cycle work schedule in seams less than 3 meters thick have achieved an increase not only in output but also in labor productivity of worker per section and of cutting and loading personnel. An increase in output at faces in seams more than 3 meters thick somewhat lowers labor productivity. It is recommended that seams of this thickness be worked by the double-slicing method. In working thick seams in the Moscow basin by the double-slicing method, faces successfully complete one cycle per day both for the upper slice (Mine No 26 of the Stalinogorskugol' Trust, faces 24-26, 28-30, and others; Mine No 35 of the Krasnoarmeyskugol' Trust, faces 13-15 and 17-19; a number of faces in mines No 36, No 37, and others of the same trusts), and for the lower slice (Mine No 26, faces 22, 22-bis, 32, and others).

DONBASS MINE INCREASES IN EFFICIENCY THROUGH CYCLE WORK -- Moscow, Mekhanizatsiya Trudoyemkikh i Tyazhelykh Rabot, No 10, Oct 53

Mine No 63 of the Iverdlovugol' Trust of the Voroshilovgradugol' Combine was constructed in 1946, has a planned capacity of 800 tons per day and is working a nongassy anthracite seam K₂₁ of the Verkhne-Dolzhanskiy series. The thickness of the seam is 1.12-1.25 meters and the angle of dip is 11-19 degrees. The floor of the seam is clayey shale and heaves slightly under the influence of pressure from the side rock. The roof of the seam is clayey shale 10-12 meters thick. Within the limits of the mine field, there are some disturbances of the seam. Consequently, the roof is unstable. The mine field is opened up by two parallel, sloping shafts. The continuous method of mining is being employed and roof control is effected by partial backfilling. The mine is working a level 360 meters high which is divided into three sublevels.

In the central shaft of the mine, there is continuous haulage with the aid of an OL-9-12.5 winch at a depth of 1,100 meters. In the sloping auxiliary shaft, a BM-2500-2030 elevator has been installed which also goes to a depth of 1,100 meters and is used for lowering and raising personnel, equipment, and materials. Coal is cut by KMP-1 cutting machines with 2-meter cutting bars. An operator and assistant handle the machine. Cutting of the 100-meter face takes 7 hours. Coal is conveyed at the faces by gravity along stationary strips. In the intermediate passages, coal is transported by JKR-11 conveyers which operate for two shifts and are inspected and repaired during the third shift.

All faces of Mine No 63 operate on the cycle work schedule. For the past 3 years, the working faces have been regularly fulfilling their norms. The mine has become a profitable enterprise, wages of the workers are high, and all labor indexes of the mine have improved considerably, as is shown in the following table:

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| <u>Indexes</u> | <u>1949</u> | <u>1950</u> | <u>1951</u> | <u>1952</u> | <u>Jan-Jul 1953</u> | <u>Jul 1953</u> |
|---|-------------|-------------|-------------|-------------|-------------------------|---------------------|
| Average daily coal output (tons) | 1,166 | 1,285 | 1,505 | 1,622 | 1,637 | 1,713 |
| Number of exploitation sections | 7 | 6 | 3 | 3 | 3 | 3 |
| Average daily output per section (tons) | 167 | 214 | 501 | 546 | 562 | 571 |
| Average monthly advance of line of face (meters) | 25.4 | 28.9 | 43.2 | 52.6 | 53.8 | 56.9 |
| Average number of cycles for mine | 16.4 | 19.1 | 27.0 | 29.2 | 29.9 | 31.6 |
| Average monthly productivity: | | | | | | |
| Cutting machine (tons) | 6,400 | 5,996 | 8,490 | 9,120 | 9,238 | 9,794 |
| Electric locomotive (ton-kilometers) | 6,632 | 6,092 | 9,218 | 15,073 | 13,339 | 12,661 |
| Average number of exploitation workers | 1,000 | 974 | 911 | 928 | 926 | 907 |
| Average monthly productivity per exploitation worker (tons) | 34.7 | 39.2 | 49.2 | 52.0 | 54.4 | 58.3 |
| Average completion of norm by exploitation worker (percent) | 115.5 | 123.6 | 131.7 | 138.5 | 133.0 | 122.5 |
| Average monthly wages per exploitation worker (rubles) | 1,162 | 1,150 | 1,287 | 1,290 | 1,221 | 1,258 |
| Production costs per ton of coal for mine (percent) | 100 | 84.7 | 75.5 | 67.7 | 66.2 | 62.7 |
| Profits (million rubles) | 13.0 | 21.5 | 31.7 | 32.1 | 19.1 | 2.6 |
| Total awarded to workers in socialist competition (thousand rubles) | 22.5 | 311.0 | 401.0 | 800.0 | 262.8 | 101.0 |

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The number of workers employed in various operations was reduced. In underground transport, the consolidation of sections, the concentration of loading, and the improvement of haulage passages and workings led to a decrease of 59 workers. At the surface, workers in coal-storage areas were decreased by 19, those in the machine shop, by 1, and personnel for the removal of rock from coal heaps and rail cars, by 18. The only increase was in 16 extra workers for coal cleaning, with the result that the mine now supplies coal with a reduced ash content.

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